Samantha Archer

PhD Student, Stanford University

Phone: 703-862-1246
Email: samanthaarcher@stanford.edu

EDUCATION

2023 - Current	**Stanford University** PhD Student, Electrical Engineering Department Advisor: Dr. Caroline Trippel
2016 - 2020	**Duke University** BSE Electrical & Computer Engineering BA Mathematics GPA: 4.0/4.0

RESEARCH INTERESTS

My interests lie broadly in computer architecture and hardware design. Recently I have been working on problems related to hardware security, specifically quantifying side channel leakage in specific programs using microarchitectural-informed side channel analysis. Beyond security, I am interested in hardware design optimization, memory consistency models, formal methods, and information theory applied to hardware design.

AWARDS

1. August 2022 NSF CSGrad4US Fellowship
2. May 2020 Charles Ernest Seager Memorial Award, Duke University
3. May 2020 Walter J. Seeley Scholastic Award, Duke University
4. May 2020 Summa Cum Laude
5. December 2019 IEEE-Eta Kappa Nu
6. May 2019 Tau Beta Pi
7. Sept 2016 - May 2020 Duke University Dean’s List with Distinction

PUBLICATIONS

CONFERENCE

Samantha Archer, Georgios Mappouras, Robert Calderbank, and Daniel J. Sorin. “Foosball Coding: Correcting Shift Errors and Bit Flip Errors in 3D Racetrack Memory.” 50th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2020), June 2020.

THESIS

Samantha Archer. "Foosball Coding: Improving Error Tolerance in 3D Racetrack Memory." Undergraduate Thesis. May 2020.

PRESENTATIONS

CONFERENCE TALKS

"Foosball Coding: Correcting Shift Errors and Bit Flip Errors in 3D Racetrack Memory." *50th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2020)*, June 2020.

PATENTS

Patent Pending: United States Provisional Application No. 63/312,864. "Heart Rate Monitor." Inventors: Mary S. Elder, Amy D. Nicholson, Juliane M. Henne, Shawn R. Harvill, Sarah C. Bland, **Samantha R. Archer**. Filed: Dec. 29, 2022.

PROFESSIONAL EXPERIENCE

2023 - Current	**Stanford University** Graduate Student Researcher Advisor: Dr. Caroline Trippel	Stanford, CA
2020-2023	**NVIDIA Corporation** Senior Synthesis Hardware Engineer Synthesis Hardware Engineer	Santa Clara, CA
2019 - 2020	**Duke University** Undergraduate Research Assistant Advisors: Dr. Dan Sorin and Dr. Robert Calderbank	Durham, NC
2017 - 2020	**Duke University** Teaching Assistant	Durham, NC
Summer 2019	**NVIDIA Corporation** Physical Design Intern	Santa Clara, CA

TECHNICAL PROJECTS

Fall 2023	**Leakage Quantification for Hardware Side Channels** Using microarchitectural leakage contracts and symbolic execution to quantify side channel leakage for cryptographic programs	Stanford Independent Research

Fall 2023	**Data Compression and Security** Researched and evaluated security vulnerabilities related to data compression algorithms and applications	Stanford Course Project
2020-2023	**Physical Synthesis Flow Design** Worked on projects related to designing and maintaining an efficient register-transfer level (RTL) to gate-level synthesis flow for all NVIDIA chips in order to achieve the best power, performance, and area	NVIDIA Industry Project
Spring 2020	**Heart Rate Monitoring Wearable Design Project** Designed a wearable specifically for women that monitors heart rate, detects posture, and communicates wirelessly with Garmin products	Duke Course Project
Spring 2020	**Constrained Codes for Mitigating Crosstalk** Applied finite state machine codes to prevent crosstalk across signals on a 3x3 array of wires	Duke Independent Research
Fall 2020	**Coding for Racetrack Memory** Developed a coding scheme to detect and correct bit flip and shift errors in 3D racetrack memory	Duke Independent Research
Summer 2019	**IR Drop Methodology** Evaluated and summarized IR drop analysis methodologies on NVIDIA designs	NVIDIA Intern Project

TEACHING

Spring 2020	TA	ECE 350: Digital Systems	Duke
Fall 2019	TA	ECE 350: Digital Systems	Duke
Spring 2018	TA	Math 106: Laboratory Calculus and Functions II	Duke
Fall 2017	TA	Math 105: Laboratory Calculus and Functions I	Duke
Spring 2017	TA	Math 112: Laboratory Calculus II	Duke

PROFESSIONAL SERVICE & ORGANIZATIONS

ORGANIZATIONS

1. Stanford Women in Electrical Engineering, Student Member
2. Duke Technology Scholars, Alumna
3. Society of Women Engineers, Student Member

SERVICE

2020 - 2023	NVIDIA Recruiting Volunteer	Spoke on panels and at recruiting events aimed at promoting diversity in NVIDIA's intern and college graduate recruiting classes
2020 - 2023	Duke Technology Scholars	Mentored college students who are interested in careers in technology
2016 - 2017	FEMMES+	Lead educational activities for elementary school girls interesting in STEM fields

COURSEWORK

Graduate: Introduction to Automated Reasoning; Data Compression: Theory and Applications
Undergraduate: Computer Architecture; Digital Systems; Coding Theory with Applications in Data Science; Fundamentals of Microelectronic Circuits; Systems and Signals; CMOS VLSI Design; Wearables and Ubiquitous Computing

ENVIRONMENTS, LANGUAGES, & DESIGN TOOLS EXPERIENCE

UNIX, Python, Verilog, TCL, C, Make, MATLAB, Perl